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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/940,101	08/27/2001	Mary E. Gerritsen	GENENT.072A2	4279

20995 7590 03/09/2004

KNOBBE MARTENS OLSON & BEAR LLP
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614

EXAMINER	
BELYAVSKYI, MICHAIL A	

ART UNIT	PAPER NUMBER
1644	

DATE MAILED: 03/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/940,101	GERRITSEN ET AL.	
	Examiner	Art Unit	
	Michail A Belyavskyi	1644	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-11 and 23-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3, 5-11 and 23-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-3, 5-11 and 23-27 are pending

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 01/13/04 has been entered.

Claims 1-3, 5-11 and 23-27, as they read on the methods for controlling excessive proliferation or migration of smooth muscle cells in vitro comprising administering an effective amount of an antibody antagonist of a native ErbB4 receptor of SEQ ID NO:2, are under consideration in the instant application.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112.

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 26 and 27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claims 26 and 27 are indefinite and ambiguous in the recitation of " antibody binds essentially the same epitope as an antibody produced by ...". The characteristics and metes and bounds of " essentially the same epitope" are unclear , indefinite and do not disclosed in the specification.

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 26 and 27 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention.

8. In claims 26 and 27 it is apparent that the an antibody produced by a hybridomas HER4.10H1.1A1 , HER4.1C6.A11, HER4.3B9.2C9, HER4.1A6.5B3 and HER4.8B1.2H2 are required to practice the claimed invention. As a required element, it must be known and readily available to the public or obtainable by a repeatable method set forth in the specification. If they are not so obtainable or available, the enablement requirements of 35 U.S.C. 112, first paragraph, may be satisfied by a deposit of the pertinent hybridomas which produce these antibodies. See 37 CFR 1.801-1.809.

It is noted that page 8 of the specification at lines 1-10 indicates that these hybridomas have been deposited with the ATCC.

If the deposits have been made under the terms of the Budapest treaty, an affidavit or declaration by applicants or someone associated with the patent owner who is in a position to make such assurances, or a statement by an attorney of record over his or her signature, stating that said hybridomas have been deposited under the Budapest Treaty and that the said hybridomas will be irrevocably and without restriction or condition released to the public upon the issuance of a patent would satisfy the deposit requirement made herein. See 37 CFR 1.808. Further, the record must be clear that the deposit will be maintained in a public depository for a period of 30 years after the date of deposit or 5 years after the last request for a sample or for the enforceable life of the patent whichever is longer. See 37 CFR 1.806 1.808 (a)(2) and MPEP 2410-2410.01.

If the deposits have not been made under the Budapest treaty, then an affidevit or declaration by Applicants or someone associated with the patent owner who is in position to make such assurances, or statement by an attorney of record over his or her signature, stating that the deposit has been made at an acceptable depository and that the criteria set forth in 37 CFR 1.801-1.809, have been met.

Amendment of the specification to disclose the date of the deposit and complete name and address of the depository is required

9. Claims 1-3, 5-11 and 23-27 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a method of partially inhibiting proliferation or migration of smooth muscle cells *in vitro* , comprising administering an effective amount of antibody to native ErbB4 receptor of SEQ ID NO:2 does not reasonably provide enablement for a methods for controlling excessive proliferation or migration of smooth muscle cells in vitro comprising administering an effective amount of an antibody

antagonist of a native ErbB4 receptor of SEQ ID NO:2. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims for the same reasons set forth in the previous Office Action, mailed 07/17/03.

Applicant's arguments, filed 01/13/04 have been fully considered, but have not been found convincing.

Applicant asserts that claim 1 has been amended to refer to an *in vitro* application, thus all claims refer to methods for controlling excessive proliferation *in vitro*.

The Examiner agrees that the amendment to claim 1 has obviated the previous rejections with respect to *in vivo* administration and treating of stenosis comprising administering an effective amount of antibody to native ErbB4 receptor of SEQ ID NO:2.

However, the rejection is still maintains with respect to " a methods for controlling excessive proliferation". The specification disclosed that the term "controlling" is used to refer to total inhibition of proliferation (see page 6, line 14 in particular). As was stated in the previous Office Action, based on the data shown in Fig. 5, that BrdU uptake was reduced only about 20-30% after human aortic smooth muscle were incubated in the presence of antibody to native ErbB4 receptor , one skilled in the art at the time the invention was made would interpreted this results as partial but not total inhibition of proliferation. Applicant himself acknowledges that these examples only shown that only part of the mitotic and migration responses of said cell are mediated by the activation of the Erb4 receptor (page 68, lines 3-10 and 25-30 of the specification as filed). In other words, total prevention of excessive proliferation and migration of smooth muscle cells, even in cell culture, as claimed in claim 2 , was not achieved by administration of antibody to native ErbB4 receptor of SEQ ID NO:2.

Thus, Applicant has not provided sufficient guidance to enable one skill in the art to use claimed method of a complete inhibiting proliferation or migration of smooth muscle cells *in vitro*, comprising administering an effective amount of antibody to native ErbB4 receptor of SEQ ID NO:2 comprising administering an effective amount of antibody to native ErbB4 receptor in manner reasonably correlated with the scope of the claims. The scope of the claims must bear a reasonable correlation with the scope of enablement. *In re Fisher*, 166 USPQ 18(CCPA 1970) indicates that the more unpredictable an area is, the more specific enablement is necessary in order to satisfy the statute.

In view of the quantity of experimentation necessary, the unpredictability of the art, the lack of sufficient guidance in the specification, the limited working examples, and the limited amount of direction provided given the breadth of the claims, it would take undue trials and errors to practice the claimed invention.

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 1-3, 5-11 and 23-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Paten 5,811,098 in view of Krymskaya et al (Am. J. Physiol.1999, 276, pages L246-L255) or WO 99/02681 for the same reasons set forth in the previous Office Action, mailed 07/14/03.

Applicant's arguments, filed 01/13/04 have been fully considered, but have not been found convincing.

Applicant asserts that : (i) the cited references lack disclosure of an antibody to naive ErbB4 receptor of SEQ ID NO:2; (ii) none of the cited references discuss or suggest a method for controlling excessive proliferation *in vitro* by treating smooth muscle cell; (iii) the cited references do not provide any teaching or suggesting that control of cancer cell proliferation by antibody administration might be relevant to a method for control of smooth muscle cell proliferation or migration; (iv) Krymskaya et al., teach that ErbB4 receptors do not play a role in smooth muscle proliferation, thus provides no teaching that one could control or inhibit smooth muscle proliferation and (v) WO 99/02681 nowhere suggests or provide motivation that antagonists to ErbB4 receptor might be useful to control smooth muscle proliferation.

Applicants have traversed the primary and the secondary references pointing to the differences between the claims and the disclosure in each reference. Applicant is respectfully reminded that the rejection is under 35 USC103 and that unobviousness cannot be established by attacking the references individually when the rejection is based on the combination of the references. see In re Keller, 642 F.2d 4B, 208 USPQ 871, 882 (CCPA 1981) See MPEP 2145. This applicant has not done, but rather argues the references individually and not their combination. One cannot show non-obviousness by attacking references individually where the rejections are based on a combination of references. In re Young 403 F.2d 759, 150 USPQ 725 (CCPA 1968).

In response to applicant's arguments that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See In re Fine 5 USPQ2d 1596 (Fed. Cir 1988) and In re Jones 21 USPQ2d 1941 (Fed. Cir. 1992). In this case the teachings of US Patent '098 pertaining to the a method of controlling excessive proliferation of cancer cells by administering an neutralizing antibodies to native HER4 receptor and the fact that said HER4 receptor (SEQ ID NO: 2) that is 100% identical to SEQ ID NO:2 of ErbB4 receptor of the current application and the teachings of Krymskaya et al., and WO '681 indicating that HER4 receptor play a pivotal role in regulation of proliferation of smooth muscle cells would have led one of ordinary skill in the art at the time the invention was made to combine the references to obtained a method controlling excessive proliferation or migration of smooth muscle cells *in vitro* comprising administering an effective amount of an antibody of a native ErbB4 receptor of SEQ ID NO:2. The strongest rationale for combining reference is a recognition, expressly or implicitly in the prior art or drawn from a convincing line of reasoning based on established scientific principles or legal precedent that some advantage or expected beneficial result would have been produced by their combination In re Sernaker 17 USPQ 1, 5-6 (Fed. Cir. 1983) see MPEP 2144

US Patent '098 teaches a method of controlling excessive proliferation of cancer cells by administering an antibodies to native HER4 receptor (see entire document, Abstract in particular). US Patent '098 further teach that antibodies is a neutralizing antibody, chimeric, humanized or human antibody or glycosylated antibody (see columns 18-19 in particular). US Patent '098 also teach that said antibodies can be used to block signal transduction mediated through HER4 receptor, thereby inhibiting undesirable cell function and behaviors, including proliferation and migration (see column 22, lines 44-66 in particular). US Patent '098 teach that said antibody can be used *in vitro* for various diagnostics and treatment purposes (see columns 21, 23 and 54 in paricular). US Patent '098 teaches an amino-acid sequence of HER4 receptor (SEQ ID NO: 2) that is 100% identical to SEQ ID NO:2 of ErbB4 receptor of the current application (see attached sequence alignment).

US Patent '098 does not teaches a method of controlling excessive proliferation or migration of smooth muscle cells *in vitro*.

Krymskaya et al. teach the presence of ErbB4 receptor on the human airway smooth muscle cells (see entire document, abstract in particular). Krymskaya et al. teach that this receptor play a pivotal role in regulation of proliferation of smooth muscle cells and that uncontrolled proliferation of smooth muscle cells results in various pathologies and

that regulation of proliferation of said cells has potential significance in treating said pathologies. Applicants attention is respectfully directed to abstract and page L254.

Similarly , WO 99/02681 teaches the presence of ErbB4 receptor on smooth muscle cells and that blocking signal transduction pathway mediated through this receptor can effect mitotic activity of cells expressing said receptors (see entire document, page 8, lines 35 – 40 and page 17, lines 27-35 in particular).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to apply the teaching of Krymskaya et al ., or WO 99/02681 to those of US Patent '098 to obtain a claimed method for controlling excessive proliferation or migration of smooth muscle cells in vitro comprising treating said cells with antibody to ErbB4 receptor of SEQ ID NO:2.

One of ordinary skill in the art at the time the invention was made would have been motivated to do so, because signal transduction mediated through ErbB4 receptor plays a pivotal role in regulation of proliferation of smooth muscle cells and uncontrolled proliferation of smooth muscle cells results in various pathologies and regulation of proliferation of said cells has potential significance in treating said pathologies as taught by combined teaching of Krymskaya et al. or WO 99/02681 . This uncontrolled proliferation can be blocked by a method taught by US Patent '098 using antibodies to ErbB4 receptor, that will block signal transduction mediated through ErbB4 receptor .

From the combined teaching of the references, it is apparent that one of ordinary skill in the art would have had a reasonable expectation of success in producing the claimed invention. Therefore, the invention as a whole was *prima facie* obvious to one of ordinary skill in the art at the time the invention was made, as evidenced by the references, especially in the absence of evidence to the contrary.

Claims 26 -27 are included because an antibody to native HER4 receptor taught by US Patent '098 would obviously bind to the same epitope as an antibody recited in the claims because an amino-acid sequence of HER4 receptor taught by US Patent '098 is 100% identical to SEQ ID NO:2 of ErbB4 receptor of the current application. Moreover, because total amino-acid sequence of ErbB4 receptor was known and it would have been obvious, conventional and within the skill of the art to make an antibody that will binds essentially the same epitope as an antibody recited in said claims.

12. No claim is allowed.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michail Belyavskyi whose telephone number is 571/ 272-0840 The examiner can normally be reached Monday through Friday from 9:00 AM to 5:30 PM. A message may be left on the examiner's voice mail service. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Chan can be reached on 571/ 272-0841 .

The fax number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michail Belyavskyi, Ph.D.
Patent Examiner
Technology Center 1600
February 24, 2004

CHRISTINA CHAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1600